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ABSTRACT

In the United States and in most of the world, a recent trend in education has been movement away from single-sex secondary schooling and toward coeducation. Single-sex schools are closing or merging for reasons that often have very little to do with the academic merits of coeducation or single-sex education at the secondary level. This study examines current research comparing these two school types and draws conclusions that call into question the wisdom and educational effectiveness of coeducation. Recommendations offered for future action include: (1) that faculty and administration renew their commitment to the purpose of education, (2) that schools work at creating an environment for learning, and (3) that states encourage and support private single-sex schools. A brief historical overview of coeducation and a discussion of two major studies of the two school types are followed by a 27-item annotated bibliography of research on the topic of gender-composition of secondary schools. This material is presented under broad categories: (1) the effects of coeducational and single-sex schools on the school environment; (2) the effects of coeducational and single-sex schools on academic achievement of students; (3) the effects of coeducational and single-sex schools on overcoming traditional sex-role stereotyping in education; and (4) the effects of coeducational and single-sex schools on the academic performance of female students. A 43-item bibliography of works cited is included. (JB)

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An Annotated Bibliography Of The Research Comparing Academic Achievement And Attitudes of Students In Coeducational And Single-Sex Secondary Schools

by
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U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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STATEMENT OF THE PROBLEM

While the current movement in education has been away from single-sex schools, they may actually facilitate the intellectual and social development of some adolescent students, particularly females.

PURPOSE OF THE STUDY

In the United States as in most of the world, a recent trend in education has been movement away from single-sex secondary schooling toward coeducation (Greenough 31). Single-sex schools are closing or merging for reasons that often have very little to do with academic merits of coeducation or single-sex education at the secondary level. Because many of the arguments in support of coeducation have considerable common-sense appeal particularly the argument that they provide a more normal social environment for students, many educators regard this issue as already having been decided in favor of mixed schools. However, research offers arguments against this movement that are equally compelling. The purpose of this study is to examine current research comparing these two school types, to draw conclusions that call into question the wisdom and educational effectiveness of coeducation and to offer recommendations for future action.

ORGANIZATION OF THE STUDY

Following a brief historical overview of coeducation in the United States and the examination of two major significant studies of the two school types, research on the topic of gender-composition of secondary schools will be presented under four broad categories:

1) the effects of coeducational and single-sex schools on the school environment--interaction among students, satisfaction with school, relationships between students and faculty.
2) the effects of coeducational and single-sex schools on academic achievement of students--subject area comparisons, test scores, later university degree attainment.
3) the effects of coeducational and single-sex schools on overcoming traditional sex-role stereotyping in education--subject preference, attitudes, leadership behavior of female students.
4) the effects of coeducational and single-sex schools on the academic performance of female students--achievement levels for girls, fear of success influences.

Studies are grouped according to these categories by year of publication with the most recent studies presented first. Studies resulting in no significant difference are placed at the end of each set of annotations. Each section is introduced with commentary.

LIMITATIONS OF THE STUDY

As American single-sex education is now confined almost entirely to the private sector, a great deal of available evidence on this topic was from schools outside the United States. Studies in Great Britain, Canada and Australia dominated the research and that dominance is reflected in the present study. In addition the whole subject of differences in adolescent physiological and psychological development of males and females, while worthy of consideration as it related to educating boys and girls together, lay outside the scope of this paper. The body of research specific to coeducation in the area of physical education and athletic teams also lay outside the scope of the present study. Studies reviewed here were limited to scientific, empirical research from 1961 and covered topics concerning only secondary schools or their equivalents in other national systems.

GLOSSARY

attainment, levels of--stages of achievement reached by children....generally expressed in terms of grade levels (Good 47).

coeducation--an educational practice according to which both boys and girls attend the same school; was begun at elementary level in the Protestant countries during the Reformation but did not reach the secondary and higher levels until begun in the United States in the early part of the nineteenth century. Coeducational schools are also referred to as mixed schools (Good 111).

comprehensive high school--a secondary school that includes both general education courses and specialized fields of study in its program and thus offers academic, commercial, trade and technical subjects (Good 281).

subculture--a custom or customs characteristic of a sub-group, a part of a larger group or society whose members have a common culture (Good 567).

NOTE: The terms single-sex, noncoed and sex-segregated are used synonymously.

ANNOTATIONS

Historical Overview

Education for girls as well as boys did not take root in the United States until the nineteenth century. The reasons and arguments used against it were many and are somewhat preposterous to the modern educator: the inferior intellectual capacity of girls made profit from education impossible even if it were offered to them; education would make young women less refined and it was believed that the rate of fertility decreased as a young woman's amount of formal education increased. However, the Protestant Reformation had made Bible reading necessary for girls as well as boys and the ideology of the American Revolution based on the principle of equality and the inherent right to the pursuit of happiness made it difficult for traditional arguments of women's inferiority to be justified. By their roles in the settlement of the American frontier and the Industrial Revolution, women were also proving their worth. Thus educational opportunities were gradually opened up for girls (Atkinson and Maleska 123).

In 1826 the problem of providing secondary education for girls was met in Boston and elsewhere by establishing separate schools for them. Farther west in Massachusetts a "female" department was set up in a boys school to offer courses parallel to those for boys. Although separate schools continued for many years, that was the first step toward secondary school coeducation in the United States (Atkinson and Maleska 104). In Chicago in 1856, the first completely coeducational high school was established (DeYoung 179). However, it was not until the 1960s and 1970s that social and economic reasons motivated a

movement away from single-sex education at the secondary level. Sex-segregated schooling was then viewed as a barrier to successful cross-sex socialization. All-girls and all-boys institutions began to close or to merge in an attempt to create schools that were more viable both economically and socially. It was also at this time that two very different significant landmark studies were being conducted in educational research. One, by Reginald R. Dale in England (1969, 1971, 1974), became the mainstay of the argument for coeducation. The other in the United States by James S. Coleman (1961) offered one theoretical rationale for favoring single-sex secondary schools.

Dale's work, published in three volumes entitled Mixed Or Single-Sex School? pointed unmistakably to coeducation as the preferable system. By administering questionnaires to thousands of pupils, ex-pupils and teachers in British secondary grammar schools on a multitude of topics, Dale found that the coed school was a happier community for staff and students than a single-sex school. Dale concluded that the best type of school created a microcosm of society incorporating within it all the essential features of life in the world outside school and preparing children to take a place in the community of men and women. While Dale's research identified only positive features in school environment and social structures of mixed schools, it provided no evidence of lower academic standards. In fact, Dale maintained that boys and girls did as well or better in mixed as in single-sex schools because competition between sexes caused them to work harder and the social atmosphere made school life more pleasurable. Therefore, Dale's work became the basis for widely-accepted move toward a coeducational system that placed

education in a more natural, pleasant environment at no expense to academic achievement.

In the book, The Adolescent Society, James S. Coleman reported the results of a survey of ten midwestern American high schools. Coleman's research led him to contend that the setting apart of boys and girls in schools has had a singular effect on the children of high school age. It has virtually cut them off from the rest of society, and made them carry on their entire social life with others their own age (3). Thus according to Coleman, adolescents constitute a society—a subculture where participants have most of their interactions with their peer group and maintain conflict-laden connections with the adult world. Coleman reported that students in this adolescent subculture valued scholastic achievement less than other activities in all ten schools. His research revealed the link between this subculture and coeducation:

> It is commonly assumed, both by educators and by laymen, that is is "better" for boys and girls to be in school together during adolescence, if not better for their academic performance, then at least better for their social development and adjustment. Coeducation in some high schools may be inimical to both academic achievement and social adjustment. The dichotomy often forced between "life adjustment" and "academic emphasis" is a false one, for it forgets that most of the teenager's energy is not directed toward either one of these goals. Instead, the relevant dichotomy is cars and the cruel jungle of rating and dating versus school activities, whether of the academic or

life-adjustment variety. (51)

The work of education historians Atkinson and Maleska (1962) also indicated that teenagers are avid status seekers in their own societies. Boys considered success in studies less important than proficiency in athletics. Girls put the greatest store in attractiveness to boys and in student activities. They reported that the brightest girls deliberately shied away from academic excellence because it could lower their popularity with the boys. Moreover students were less interested in parental approbation than in the approval of their classmates (438).

The cumulative effect of this separate society in schools has been to de-emphasize education (Coleman 50). Twenty years after Coleman's study, John Goodlad, in A Place Called School (1984), observed that as schools took on ever more functions, ever more extra-curricular activities and kept students together for increasing periods of time, the peer group emerged as a powerful negative educational force, replacing family and cross-generational relationships. The electronic media moved in on this cohesive group, now an affleunt market, and catered to its interests, created its tastes, molded its consumerism and passed before it an array of role-models all of which undermined the true cultural, scholastic purpose of the high school (42).

Thus the most extensive study of mixed and single-sex schools done by Dale concluded that coed schools were more successful than single-sex schools in every way--academically, attitudinally and socially. On the other hand, Coleman argued that the social structure

of the coeducational high school has driven students to create a youth culture that is tremendously detrimental to the intellectual and social development of adolescents. These monumental research efforts, together with the continuing commitment in American education to open up educational opportunities to women have formed the background against which the controversy of single-sex versus coeducational secondary education has taken place. What is the effect of single-sex schools as opposed to coeducational schools on school environment? How does academic achievement in single-sex schools compare with that in coed schools? How does single-sex schooling compare to coeducational schooling with regard to promoting or overcoming traditional sex-stereotypes? What differences in academic attitudes, behaviors and performance of female students result from education in single-sex schools or coeducational schools? Is secondary education in America enriched or impoverished by the gradual disappearance of the single-sex school?

Effects of Coeducational and Single-Sex Schools On School Environment

One of the major assumptions underlying the debate was that critical differences exist between the social and psychological environments of the two school types. Four of the following five pieces of research showed significant differences in the atmosphere and environment, relationships and socialization between coeducational and single-sex schools.

Trickett, Edison J. et al. "The Independent School Experience: Aspects of the Normative Environments of Single-Sex and Coeducational Secondary Schools." Journal of Educational Psychology 74 (1982): 374-381.

Trickett, et al. analyzed 15 representative single-sex and coeducational independent schools in the United States using Trickett and Moos's Classroom Environment Scale, a 90-item scale that assessed nine dimensions of classroom environment as perceived by students: student involvement, affiliation, teacher support, task orientation, competition, order, teacher control, innovation and rule clarity. The sample included 456 students. The students also completed the Student Experience Questionnaire (SEQ) determining aspects of student participation in the school environment. Areas here included participation in extra-curricular activities, use of free time, perception of feminist sentiment in the school, etc. Results showed students perceived single-sex schools as having a more academic orientation, and giving more importance to competition and task completion than coed schools. Results of the SEQ showed students spending more time on homework, less time on extra-curricular activities if they were in a single-sex institution than if they were in a coed school. In particular, students in single-sex institutions reported more interest in the women's movement in their schools than students in coed schools.

Schneider, Frank W. and Larry M. Coutts. "The High School Environment: A Comparison of Coeducational and Single-Sex Schools." Journal of Educational Psychology 74 (1982): 898-906.

Schneider and Coutts gathered data from a total of 2029 students in grades 10 and 12 from five coeducational, four all-female and four all-male high schools in Southwestern Ontario to test three hypotheses that compare single-sex schools with coeducational schools. The researchers held that coeducational schools would be perceived by their students as placing 1) less emphasis on academic achievement, 2) greater emphasis on pleasurable non-academic activities, and 3) less emphasis on control and discipline when compared to students in single-sex schools. Students in the sample completed questionnaires to measure the value climate and environmental press of their schools. From the perspective of the students, coed schools enjoyed an advantage primarily in the social domain--more pleasant atmosphere, more attention to the students' social and emotional needs, and less need for structure and discipline. Support for hypotheses 2 and 3 was attained while results for hypothesis 1 were inconsistent. In general this study showed considerable differences between social and psychological environments of mixed-sex and single-sex schools. The authors left it to future research to ascertain whether or not these advantages occurred at the expense of academic achievement.

Atherton, B.F. "Coeducational and Single-Sex Schooling and Happiness of Marriage." Educational Research 15 (June 1973): 221-226.

The purpose of this study was to determine whether attendance at a coeducational or single-sex school was associated with happiness of marriage. Two-thousand five-hundred thirty-six replies to questionnaires were recieved (1116 men and 1420 women). Respondents were spread geographically over England, Scotland and Wales and the sample gave a reasonable age spread under 50 years of age. The Chesser questionnaire to measure marital happiness was used. Scores were compared for groups of men of coeducational background with men of single-sex school background and women from coeducational secondary schools with women from single-sex schools. In both comparisons, the coed group scored higher but statistical analysis gave a critical ratio below significance level (.05) for men and rather more below for women. Results suggested that prolonged segregation in single-sex schools may harm chances for successful marriage and that coeducation may be conducive to marital happiness. Respondents expressed personal opinions that coeducation was helpful toward establishing good relations with the opposite sex and toward happiness in marriage.

Campbell, R.J. "Coeducation: Attitudes and Self-Concepts of Girls at Three Schools." Master's thesis reported in British Journal of Educational Psychology 39 (1969): 87.

This study was a comparison of attitudes to school, home, peers and self among 105 pupils from a girls school and two coeducational schools to examine whether these second-year students would show the same differences as college students whose retrospective reports on school environment were analyzed by Dale (1966). Analysis of these responses showed a significant tendency for girls in single-sex schools to regard home and school in a more hostile light than girls in coeducational schools. Attitudes to self showed no significant differences.

Feather, N.T. "Coeducation, Values and Satisfaction With School." Journal of Educational Psychology 66 (1974): 9-15.

In this study 1307 students in the last two years of secondary school in four coeducational and four single-sex schools in Adelaide, Australia rated their values, the values of their schools and their happiness with school using the Rokeach Value Survey and a modified Cornell Job Description Index. Eighteen values such as self-respect, family security, happiness and mature love were ranked by students in order of importance to themselves and again for their schools. Eighteen personal traits such as independence, honesty and obedience were likewise ranked. Measures of school satisfaction were also obtained with regard to school-work, people in the respondent's class and the typical teacher. Based on earlier studies, the hypothesis here was that students from coed schools might regard values relating to social approval and affiliation as more important to themselves than would students from single-sex schools. The results gave no support to possible adverse effects of coeducation on student values. This study indicated that there are few differences in the way boys and girls from coeducational and single-sex schools assigned importance to values.

Effects of Coeducational and Single-Sex Schools
On Academic Achievement

Psychologists have viewed the early and pre-adolescent period as a critical point in intellectual development. It is at this time, according to Mark Braham, that intelligence, "viewed as a coordination of sensori-motor, perceptual, cognitive and conceptual activities appears as a functioning organization. The period between approximately the tenth and twelfth years of a child's life marks a definitive point in his intellectual life, such that the prior years may be considered as the period of intellectual birth, and with adolescence as the period of true intellectual growth" (251). The problem at this time, Braham also noted, was that just as intelligence was beginning to function and required the most nurturing conditions, the adolescent met a "major deterrent to its development--the intellectually negating adolescent peer group" (252). This subculture, centered in the coeducational high school where intellectual activities should be a major concern, demands conformity to non-intellectual standards. Eight of the following eleven research investigations concluded that coeducational schools, as a major part of this detrimental adolescent peer group society, exerted a stultifying influence on intellectual development when compared to single-sex schools.

Lee, Valerie E. and Anthony S. Bryk. "Effects of Single-Sex Secondary Schools on Student Achievement and Attitudes." Journal of Educational Psychology 78 (1986): 381-392.

In this study Lee and Bryk investigated the effects of single-sex and coeducational secondary school organization. They used a random sample of 1807 students in 75 Catholic high schools (45 were single-sex institutions) drawn from the High School and Beyond study (1980). They analyzed eleven areas of attitude, behavior and achievement such as absenteeism, time spent on homework, course enrollment, reading, science and math achievement, sex role stereotyping, etc. at the sophomore and senior years as well as analyzing the gain from grade 10 to grade 12. Lee and Bryk made statistical adjustments for family and personal background, curriculum tracking and school social composition. Their findings indicated that single-sex school students surpassed their coeducated counterparts in every area of achievement at both years. In all eleven areas they reported all of the statistically significant single-sex school effects were positive, especially for female students. Lee and Bryk made a careful discussion of possible alternative factors in the individuals and in the schools contributing to these single-sex school effects yet concluded that the critical factors for success were inherent in the single-sex composition where social and academic concerns were separated. They urged that their research at minimum ought to support more exploration of single-sex schooling. Further results consistent with theirs would warrant discovering ways to preserve existing single-sex schools and to encourage their development in places where that alternative does not exist.

Riordan, Cornelius. "Public and Catholic Schooling: The Effects of Gender Context Policy." American Journal of Education 93 (1985): 518-540.

Riordan cited earlier studies reporting that Catholic schools were more effective than public schools in terms of cognitive outcomes. His paper analyzed and compared school effectiveness for three types of schools--single-sex Catholic, mixed-sex Catholic, and mixed-sex public. In eight comparisons using data from the National Longitudinal Study of the High School Class of 1972 (vocabulary, reading, math, SAT verbal, SAT math, educational attainment, 1979 verbal and 1979 math), Riordan found no clear differences between Catholic mixed-sex schools and public mixed-sex schools. However, results showed Catholic single-sex schools on average were nearly twice as effective as Catholic mixed-sex schools. This was true after controlling for race, socioeconomic status, sex and geographic region. He found sufficient basis to expect that single-sex school advantages may be stronger for females than for males. Riordan speculated that Catholic schools were able to offer stronger academic programs because they were reducing the adolescent subculture influences. He concluded that his results temper slightly the reports of a general Catholic school advantage over public schools and recommended that future comparisons be limited to coeducational schools. Riordan maintained that the decision to close or merge single-sex schools may be one of the most underresearched policies in education.

Hamilton, Marlene A. "Performance Levels in Science and Other Subjects for Jamaican Adolescents Attending Single-Sex and Co-Educational High Schools." Science Education 69 (1985): 525-547.

Hamilton's study compared academic achievement levels of students in coeducational schools with those in single-sex schools. Data from 1146 eleventh grade Jamaican students regarding performance on the General Certificate of Education "Ordinary" level examinations was gathered. Specific attention was given to science performance. The students attended fifteen high schools: three single-sex boys schools, five single-sex girls schools and seven coeducational schools. Hamilton reported that students from coed schools performed worse on all aspects (ranges, means, standard deviations) of the scoring, especially girls from this school type. Results showed boys and girls in single-sex institutions performing significantly better than their counterparts in coeducational schools. These students also had better grades in the sciences. The relative standing in overall performance was 1) girls from single-sex schools, 2) boys from single-sex schools, 3) boys from coed schools and 4) girls from coed schools. Hamilton concluded that many justifications for mixed-sex education were fraudulent and that the effects of sex-stereotyping may be more sharply apparent in coeducational settings. The author offered several recommendations for teachers in coed settings among which was the suggestion that boys and girls be taught separately in masculine-typed subjects. Hamilton's sample from one of the "best" coed schools in Jamaica ruled out the suggestion that coed school students are of lower academic quality than single-sex school students.

Wood, R., and Carolyn Ferguson. "Unproved Case For Coeducation." Times Educational Supplement. 4 Oct. 1974: 22.

In this article Wood and Ferguson were very critical of Dale's 1974 findings on attainment in which he concluded there were no significant disadvantages to coeducation. They argued that his work contained a strong element of "special pleading" and contended that his data, even if sound is out of date (most surveys conducted in the 1920s) and that his sample area could not provide a suitable basis for generalization. Wood and Ferguson re-examined Dale's data and were unable to confirm his claim that academic results of coeducation are superior. They suggested that regarding sex-stereotyping, differences between the sexes within each type of school are at least as great as the differences within sex-segregated schools. Coeducation is not weakening traditional sex-linked subject allegiances. Wood and Ferguson could not find any evidence of a beneficial effect of the presence of girls on the boys. They concluded by describing Dale's evidence as "doubtful" and by urging it to be treated with caution.

Dale, R.R., and P. McC. Miller. "The Academic Progress of University Students From Coeducational and Single-Sex Schools." British Journal of Educational Psychology 42 (1972): 317-319.

A comparison of the first year progress of students at the University of Wales and Swansea from coed high schools with those from single-sex schools was made by matched pair procedure. Variables matched were Arts/Science, sex, population of school area, social class, university, best subject, average grade. In the Arts there was virtual equality. In the Sciences, coed males made slightly better progress. The authors summarized that the type of high school had only a slight association with university performance. What effect there was seemed to occur at the failing end of the first year and was in favor of coeducation. Researchers posited that single-sex students found the transition to university more difficult and were therefore at greater risk.

Jones, J. Charles, Jack Shallcross and Cathy C. Dennis. "Coeducation and Adolescent Values." Journal of Educational Psychology 63 (1972): 334-341.

A questionnaire covering student attitudes, beliefs and behaviors was administered to 1225 New Zealand secondary school students to assess the effects of coeducation on students' attitudes related to academic achievement. Students attended two single-sex schools and one coeducational school. All schools were similar in curricula, regimentation, staff and students' parents. Students responded to twelve questions dealing with scholastic activities, popularity, peer influences and self-regard. Significant differences were found between coed school girls and single-sex school girls in ten of the items and for coed school boys and single-sex school boys in six of the items. Some important statistics appeared particularly in the popularity section where 41% of the all-girls school students wanted to be remembered as brilliant students and 25.9% of the coeducated girls made this choice. Significantly more girls from the all-girls school ranked "learning as much as possible" as the most important thing they strove for in school when compared to coeducated girls. They also ranked pleasing parents higher and being accepted by other students lower. Results seemed to indicate that the adolescent social structure promoted by coeducation did exert a strong influence on adolescent values and that its rewards and sanctions weighed more heavily on girls than boys. These results suggested that coeducation may be adverse to both academic achievement and social adjustment.

King, W.H. "Experimental Evidence on Comparative Attainment in Mathematics in Single-Sex and Coeducational Secondary Schools." Educational Research 8 (Feb. 1966): 155-160.

Using a sample of 46 secondary schools (28 single-sex and 16 coeducational) and a total of 2556 students, King compared scores on three mathematics tests: 1) Raven's Progressive Matrices, 2) N.F.E.R. Mathematics Test I and 3) Step 3A Mathematics Test. Scores were analyzed to compare boys and girls, coed school boys and single-sex school boys, and coed school girls and single-sex school girls. Among the results two clear points emerged: 1) girls outperformed boys on the non-verbal test and boys were superior to girls on the Step 3A Test, and 2) boys and girls from single-sex modern schools did consistently better than those from coeducational schools.

Dale, R.R. "Research on Comparative Attainment In English In Single-Sex and Co-Edcuational Grammar Schools." Educational Research 6 (June 1964): 170-217.

This article was a review of literature and a report of Dale's own survey of attainment in English Language and English Literature. In the study by Tyson (1928) coeducated students performed slightly superior to single-sex school students. In the other three studies, King (1949), Sutherland (1961) and Dale (1964) coeducated students were found to be slightly inferior. Dale surmised that coed pupils were handicapped by such factors as lower age and lower social class and recommended further research.

Dale, R.R. "A Critical Analysis of Research on the Effects of Coeducation on Academic Attainment in Grammar Schools." Educational Research 4(Feb.1962): 207-217.

This review of research examined six studies: 1) Tyson (1925) showed an advantage for coeducation for boys and an advantage for girls to be in all-girls schools. Dale attributed the difference in the case of girls to "refined selection of candidates from single-sex schools." 2) Crofts-Clark (1937) examined 13,000 subjects from 142 boys schools, 180 girls schools, and 85 coed schools on successfully reaching matriculation. Results gave coeducation slight superiority overall. 3) Gott and Walton (1934) made two comparisons of coed, boys and girls schools in 1921-1926 and 1929-1933. They found boys coed schools superior over all-boys schools in all years. Girls in coed schools were superior over all-girls school students in 1921-1926 but girls single-sex school students were superior in the later years. Dale attributed part of the increase in girls school results to the effect of their knowledge that they were behind in the earlier study. 4) Field (1935) compared four boys schools, three girls schools and three coed schools. The study was only mentioned. Results were not reported. 5) King (1945) found coed boys superior, and single-sex girls superior when compared to their counterparts. King pointed out that in girls schools only better students took some courses, and therefore results of superiority were spurious. 6) Sutherland (1957) found coeducated boys more successful in gaining Senior Certificates; girls in single-sex schools were more successful in the same measure. Dale analyzed these results in terms of variables of age, social class, other differences in schools and nature of staffing concluding that coed boys did better and that the trend for girls was unclear.

Sutherland, M.B. "Coeducation and School Attainment." British Journal of Educational Psychology 31 (1961): 158-169.

Subjects of this study were 1829 students from 35 single-sex schools and 46 coeducational schools. Results were obtained in the Senior Leaving Certificate Examination in Northern Ireland. Mean scores were analyzed and the following comparisons were made: boys coed with boys single-sex, girls coed with girls single-sex, boys schools coed with boys schools single-sex, and girls schools coed with girls schools single-sex. Results showed segregated girls more successful than coed girls in attainment of the certificate. Boys from coeducational schools were more successful (at a lower level of significance) in attainment of the certificate than single-sex school boys. Using the individual scores as the unit, analysis of variance showed coeducated boys higher in seven out of ten subjects. Segregated girls had higher mean marks than coeducated girls in five out of twelve subjects. Differences in attainment between segregated and coeducated groups could not be attributed to differences in IQ or social class.

Miller, P. McC., and R.R. Dale. "A Comparison of the Degree Results of University Students From Co-Educational and Single-Sex Schools." British Journal of Educational Psychology 44 (1974): 307-308.

University degree results at the University of Wales and Swansea for 221 matched pairs of students with coeducational and single-sex school backgrounds were compared. Students were matched according to enrollment in Arts/Sciences, sex, population of school area, social class, university, various aspects of grading. None of the results remotely approached significance. Miller and Dale concluded that the coeducational/single-sex school variable had little association with final degree performance.

Effects of Coeducational and Single-Sex Secondary Schools on Sex-Stereotyping

One of the principles behind the move toward coeducation in modern education has been an attempt to adapt to today's world where women's roles in social and professional life are increasing. However, those who have been concerned to improve the position of women in American society have offered single-sex schooling as one strategy for overcoming sexist educational practices. Sally Schwager (1987) began her extensive study of the history of the education of women by stating that the trend toward coeducation was, "fraught with dangers for women students, women scholars and women graduates" (333). As previously stated, studies by Trickett and by Hamilton identified disadvantages of coeducational schooling for girls that lock them into limited and gender-constrained futures. Five of the following six pieces of research identify the all-girls school as a tool for overcoming traditional sex-stereotypes that restrict the potential of female students.

Vockell, Edward L., and Susan Lobonc. "Sex-Role Stereotyping By High School Females In Science." Journal of Research In Science Teaching 18 (1981): 209-219.

This study examined two questions: 1) Do current high school juniors and seniors perceive physical sciences as more masculine career fields than the biological sciences? 2) What is the influence of coeducation on these sex-stereotyped perceptions? Four coed and four all-girls high schools located in Chicago were used. Data was collected from 476 noncoed school girls, 280 coed school girls and 329 coed school boys. Questionnaires were administered requiring students to rate eight science career fields as masculine or feminine using a seven-point scale. Data supported the following conclusions: 1) Physical sciences in particular were clearly perceived as masculine academic areas. 2) The perception by girls of physical sciences as masculine was much more likely to occur in coed classes than in all-female classes. Researchers speculated that these results could be explained by two factors: attitudes conveyed by teachers and society may predispose students to accept women in biology rather than in physical science and when girls perceive themselves as a deviant minority in physical science classes, their performance will be reduced. In all-girls classes females were not a deviant minority and could perform without inhibition. This led authors to suggest that difference in sex enrollment in different science courses may contribute to sexual stereotyping in biological and physical sciences.

Schneider, Frank W. and Larry M. Coutts. "Teacher Orientation Towards Masculine and Feminine: Role of Sex of Teacher and Sex Composition of School." Canadian Journal of Behavioral Science 11 (1979): 99-111.

Subjects in this study were 296 teachers from eight coeducational, five all-male, and four all-female secondary schools in Southwestern Ontario. The study dealt primarily with the role of teacher as agent in the sex-role socialization of children with a focus on the sex of the teacher and the type of school in which he/she taught. Teachers were asked to rate the acceptability of stereotypically feminine and masculine traits, to indicate their preference for teaching boys or girls and to complete a measure of their beliefs about teaching. These differences emerged between teachers at coeducational schools and teachers at single-sex schools:

1) Coed school teachers were more likely to accept masculine traits in student behavior than were single-sex school teachers, whereas the latter were more accepting of feminine traits.
2) Coed teachers both male and female preferred teaching boys. Among single-sex school teachers, males preferred teaching male students and most female teachers preferred female students.
3) Coed teachers believed more strongly than single-sex school teachers that course content was more valuable of itself, that the teaching process should be based in students' interests and that effective teaching was enhanced by display of friendship between students and teachers.

Researchers concluded that students were more favorably disposed toward coed schools and teachers in them.

Dederick, Warren E., Judith G. Dederick, and Sue Rosenberg Zalk. "Interpersonal Values of Intellectually Gifted Adolescent Females: Single-Sex or Co-Education?" Paper presented at the Annual Meeting of the American Educational Research Association, Resources in Education, 12:93, 1977 ED 140 523.

Eight-hundred intellectually gifted adolescent girls from Hunter High School in New York City completed the Survey of Interpersonal Values (SIV). Hunter High had been an all-girls school and at the time of the study was in the process of becoming coeducational, admitting boys at lower levels. The SIV surveyed the following values: support, conformity, recognition, independence, benevolence, and leadership. Part of the study compared the responses of gifted seventh grade girls who were in coeducation settings with those in all-girls classes. Another part of the study compared gifted girls in all-female classes with a norm group from the SIV manual representing heterogenoeusly grouped girls in coed high school classes. The study revealed no significant differences in interpersonal values for seventh grade girls as a function of being in coed or single-sex classes. The difference between gifted upper-grade girls in single-sex classes and girls in the heterogeneous national sample was remarkable with Hunter girls valuing support, independence and leadership more highly and conformity and benevolence less highly. These results were confounded by two key variables: gifted v. heterogeous and coed v. all-girls.

Lockheed, Marlaine E. "The Modification of Female Leadership Behavior in the Presence of Males--Final Report." Resources in Education, 14:193-194, October 1976. ED 160 628

This research effort investigated how the effect of a female's status in a mixed-gender group of decision makers modified her leadership behaviors. Subjects were recruited from local high schools in New Jersey. They were screened for age, race, gender, cognitive style and verbal ability. Sixteen students who were unfamiliar with each other were selected. All subjects engaged in a group decision-making board game in both mixed- and single-sex four person groups of strangers. An additional condition of the study required the four subjects who played the game in a mixed-gender group to be students together in a microteaching class. The questions addressed were: 1) What are leadership behaviors of females and how are they different from males? 2) Do the behaviors of males and females differ when they work on a task in groups with the same gender peers or in groups of mixed gender? 3) Are the behaviors of males and females working on a non-academic group task correlated with their behaviors in a simulated classroom? Two important results were reported. There was no difference between general activity for all-female and all-male groups. Naive mixed-gender groups were dominated by males; mixed-gender groups of members who were experienced in a single-sex condition showed a more nearly equal distribution of activity for males and females. Lockheed suggested that teachers assign identical tasks to male and female small groups before giving the task to mixed-gender groups as a way of modifying the prevalent pattern of male dominance in mixed groups.

Ormerod, M.B. "Subject Preference and Choice In Co-Educational and Single-Sex Secondary Schools." British Journal of Educational Psychology 45 (1975): 257-267.

Drawing a sample of 1204 pupils from ten single-sex, five coed and four comprehensive schools in England, Ormerod used the Brunel Subject Preference Grid to obtain a ranking of popularity of a school subject. Gender was assigned to each subject on the basis that it was more popular with one sex or it was chosen predominantly by one sex and on the basis of the Mann-Whitney U test. The hypothesis of the study based on a review of literature was that sex-stereotyping would be stronger in coed schools. Preferences in coed schools were expected to polarize with girls prefering "female" subjects, boys prefering "male" subjects and both genders showing an aversion for subjects of the opposite sex. The number of subject differences supporting the polarization hypothesis was highly significant for both sexes with respect to subject preference. Earlier researchers explained polarization by ascribing it to loss or gain of morale of one sex or the other when they compare themselves to the opposite sex being educated with them. Ormerod proposed that teaching style and neglect or emphasis of certain topics in physical sciences may partially account for greater popularity of these subjects in girls schools.

Harris, Mary B. "Coeducation and Sex Roles." Australian Journal of Education 30 (1986): 117-131.

Subjects were 538 students in first year psychology at an Australian university. Two-thirds of the subjects were female. 38.1% had attended a coeducational high school, 42.8% had attended an all-girls school, and 19.1% had attended an all-boys school. The measuring instrument was an anonymous questionnaire of self-descriptions in terms of positive and negative masculine and feminine traits from the Australian Sex Roles Inventory (ASRI). Subjects rated their opinions about high school (satisfaction with high school, teachers, classmates) and their relations with others (friendships with members of the opposite sex, dating, falling in love during high school years and having sexual intercourse while attending high school). Results of the ASRI showed no significant differences based on the type of school attended. Opinions about high school showed the only significant difference suggested that males from coed schools and females from single-sex schools reported less satisfaction with teachers than counterparts in other school types. Coed students felt more strongly than single-sex students that coeducation fostered more natural attitudes. All groups were less likely to think students learned more in coed schools. Regarding relationships, there were no significant differences in the reported frequency of being in love or having sexual intercourse based on school type. Coed students viewed their schools as more helpful in everyday relations with the opposite sex and in leading to happy marriages. Harris's tentative conclusion was that gender composition did not exert an overwhelming influence on sex-role stereotyping. She viewed coeducation as preferable because students found it advantageous in promoting natural relationships with members of the opposite sex.

Effects of Coeducational and Single-Sex Secondary Schools
On Academic Achievement of Female Students

The historical purpose of opening schools to females was part of an effort toward greater gender equality. In modern circumstances, education has become the starting point for adopting new standards of behavior and intellectual achievement for females. However in all five pieces of research, it became clear that coeducational settings are not ideal sites for girls' learning.

Carpenter, Peter and Martin Hayden. "Girls' Academic Achievements: Single-Sex Versus Coeducational Schools in Australia." Sociology of Education 60 (1987): 156-167.

The purpose of this study was to investigate whether school sex composition affected girls' academic achievement in the final year of schooling net of other conceptually relevant factors. The study used data collected in separate investigations from two samples of high school seniors (total of 1039 female subjects) in two Australian states, Victoria and Queensland, to identify the most important predictors of academic success among girls at girls schools and coed schools. In one of the states the attendance at an all-girls school predicted a girl's exposure to key social influences and curriculum choices, particularly in advanced science, and her academic achievement. These findings were used by the authors in support of attempts in Australia to provide single-sex classrooms for subjects such as math, computer science, physics and chemistry.

Harvey, T.J. and A. Stables. "Gender Differences in Attitudes to Science for Third Year Pupils: An Argument for Single-Sex Teaching Groups in Mixed Schools." Research in Science and Technological Education 4 (1986): 163-170.

Twenty-three hundred students in seven mixed-sex schools, three all-boys schools and three all-girls schools in the South West of England were given an attitude to science test measuring attitudes toward science, physics, chemistry, biology and school. Results showed boys attitudes more positive than girls in science, physics and chemistry. For those areas girls in single-sex settings were more positive than girls in coed settings and boys in single-sex schools showed no difference when compared to boys in coed schools. With regard to attitude toward biology, girls in coed schools were more positive than girls in single-sex schools and boys in single-sex schools were more positive than boys in coed schools. Girls in coed schools clearly exhibited a more positive attitude toward school than girls in single-sex schools. The reverse was true for boys. Harvey concluded that in the physical sciences, there appeared to be an advantage for girls in single-sex schools. It did not appear to matter where boys were taught. A case was made for single-sex grouping in some teaching groups particularly in physical sciences with consideration given to math, English and languages.

Harvey, T.J. "Science in Single-Sex and Mixed Teaching Groups." Educational Research 27 (Nov. 1985): 179-182.

This study evaluated science test results of 2900 students in seventeen secondary schools in the South West of England. There were two coed schools with single-sex science classes, six coed schools with coed science classes, six all-girls schools and three all-boys schools. To make direct comparison between schools more reliable only students with identical verbal reasoning scores were compared. The experiment was aimed at finding advantages in teaching students in coed schools in single-sex classes and to determine any advantage in single-sex schools. The tests used were the Mechanical Reasoning, Evaluation of Data, Chemistry, Biology and Physics. The results indicated 1) there was no advantage to teaching students in single-sex science groups, 2) girls in coed schools perform better in science than girls in single-sex schools, and 3) no difference was noted between boys in coed schools and boys in single-sex schools.

Finn, Jeremy D. "Sex Differences in Educational Outcomes: A Cross-National Study." Sex Roles 6 (1980): 9-26.

This study described the sex differences in science and reading achievement for nationwide samples of 14-year old children in the U.S. (5193 students), England (2777 students), and Sweden (2324 students). The study also identified school characteristics associated with large-sex discrepancies. Scores on the cross-nationally standardized International Association for the Evaluation of Educational Achievement tests in reading comprehension and attitudes, word knowledge, science cognitive achievement and attitudes were compared in three phases: 1) an achievement-attitude outcome profile was formed for each student, 2) mean profiles were determined for boys and girls at each grade level in each country, separately for single-sex school students and coed school students, and 3) male-female differences were correlated on each test with selected school characteristics. Results indicated that there are largely the same differences in all three countries: male and female students have similar reading skills; males outperform females in science and males have more positive attitudes toward science. An important distinction appeared in English coed schools where girls showed a decline in science and vocabulary achievement relative to male peers. Girls in noncoed English schools exceeded their male counterparts in reading and science. Researchers hypothesized that successful female teachers and peers and the absence of social pressure from boys facilitated girls' development in these areas.

Winchel, Rachel, Diane Fenner and Phillip Shaver. "Impact of Coeducation on 'Fear of Success' Imagery Expressed By Male and Female High School Students." Journal of Educational Psychology 66 (1974): 726-730.

Two-hundred forty male and female high school seniors some attending coed and some attending noncoed schools were tested for fear of success by completing stories based on one of the following projective cues: "After completing first term finals Ann (John) finds herself (himself) at the top of her (his) medical school class." Scoring by two raters (one male and one female) tracking the positive and negative attitudes toward the achievement agreed in 96% of the cases. The analysis of data showed a significant difference between the proportion of fear of success stories evoked by the Ann cue in females from coed schools (40.9%) and in the corresponding proportion for females in single-sex schools (15.8%). The corresponding percentages for males were not significantly different. These results furthered the notion that increased cross-sex competition increased fear of success in females and seemed to argue for single-sex schooling. Winchel et al. advocated more realistic attempts to reduce motivational handicaps developed by females under current arrangements.

Conclusion

It is obvious that critical differences do exist between coeducational and single-sex secondary schools. In the areas of academic performance, sex-stereotyping, and female educational success, the advantage is clearly given to single-sex schooling. Only in the area of school environment were coeducational schools favored. Many of these findings supported the work of Coleman. Only in the topic of school environment did the studies corroborate Dale's results. From the evidence of these studies, one of American society's more cherished educational beliefs--coeducation--appears to be in need of much re-examination.

Most of the research in the area of school environment supported Dale's work. He had noted that harsh discipline, obsession with academic work and a high degree of concern for trivialities often complained of by pupils in single-sex schools were lessened in schools with pupils and teachers of both sexes (Dale, 1969). He observed from his research that students in mixed schools appeared to be less anxious about school than students in single-sex schools. Students reported positive social benefits from attending coeducational schools which placed greater emphasis on pleasurable acitivites, friendliness of peers, good social life, positive relationships with teachers, more boy-girl relationships, and less emphasis on control and discipline. The general picture that emerged was one in which coeducational schools were perceived by their students as more friendly, entertaining and enjoyable. Students and former students in coeducational schools reported being happier, more self-confident,

more tolerant of others, and more likely to have successful marriages. Undeniably coeducational school students provided a more favorable description of the social and psychological environment of their schools than did single-sex school students.

Before these results are interpreted as definitive, the question must be raised of the appropriateness of students' satisfaction with school environment as a primary standpoint from which to evaluate schools. Dale cannot justify his claims since one reason frequently given by pupils in their explanation of why they preferred mixed schools was that in single-sex schools there was too strong an emphasis on academic work and academic success. Learning has always been hard work. Some of the greatest teachers who have ever lived have been telling students that for years. In Letter VII, Plato said of some students, "As soon as they see how many subjects there are to study and how much hard work they involve, they decide that the plan is impossible for them." Henry David Thoreau in Walden said learning will task the student more than any exercise and will require a training such as the athletes undergo (77). Deem indicated that Dale seemed to miss the point that, "what pupils and ex-pupils like or dislike is not necessarily the same as what is educationally good or bad for them" (75). Student satisfaction is an important consideration yet when separated from academic achievement and school behavior, it offers a distorted view of the school (Lee 394).

Another disqualifier of these results in the social domain is the historical context of the late 1960s and 1970s when they were undertaken. At that time education critics saw schools as oppressive and called for reform that would make student life more pleasant.

Order and discipline, two of the "negative" characteristics of single-sex schools, are now viewed as traits of good schools (Lee 382). Moreover, members of the opposite sex are not totally absent from the lives of students in single-sex schools. There are more opportunities than ever for students today to have more social life outside school--jobs, athletics, entertainment. The pleasant, natural opportunities to build relationships afforded by coeducational school environments are now available in other places.

While the aims of schooling are varied, academic pursuits are rightly the highest priority. The essential element of education is transmission of life from one generation to the next. As such it is one of the most important of human activities. Through education, culture and heritage are passed on and youth are prepared for meaningful and creative adult life and the formation of intellect. In the area of academic success the research showed a clear advantage to single-sex institutions over coeducational schools.

In what Coleman referred to as "the competition for adolescent energies" (1961b, 231), scholastic pursuits did not fare as well in the coeducational school. Coeducational school students spent significantly less time on homework, were more frequently truant and were concerned more with matters of popularity and with non-academic activities. Yet there was a clear emphasis on academic success among single-sex school girls (Jones 341). King found boys and girls from single-sex schools did consistently better in attainment in mathematics than those from coeducational schools (160). In Hamilton's study coeducational school students performed worse in all subjects tested by the General Certificate of Education exam,

particularly geography, chemistry and biology. Differences were more distinct among girls (545). In Lee and Bryk's work with reading, science, math and writing achievement there were no achievement areas where coeducational school students surpassed their single-sex school counterparts (388). Every significant difference between academic achievement in coeducational and single-sex schools was positive for single-sex education.

Riordan, Lee and Bryk, and Jones, Shallcross and Dennis reported single-sex institutions showed significant success at reducing the influence of the adolescent subculture on academic performance. Lee and Bryk speculated that the separation of academic and social environments removed distractions that interfered with academic development (394). Even those researchers (Wood and Ferguson 22, Riordan 535) not arguing the case for single-sex schools per se, were unable to confirm the claim for the academic superiority of coeducational schooling. In addition, students reporting a clear preferrence for coeducational schools also admitted that they did not think students in them learned more than students in single-sex schools (Harris 126). Dale himself in a joint study with Miller found no advantageous association between class of university degrees awarded and attendance at a mixed or single-six school (Miller 307). Single-sex schools clearly perform their educational mission more successfully than coeducational schools.

Historically, the move toward coeducation was an attempt to carry out this educational mission of society in an increasingly equitable way and to open up educational opportunities for girls. Of particularly growing concern was the extension of these opportunities

beyond traditional sex roles. Contemporary adolescent females are faced with a conflict between the traditional female sex-role and the still new role of the modern woman. Schools must find the best way to encourage girls to develop their full potential and to value their academic achievement if girls are to take their place among the community of learners, scholars, and contributors to knowledge and society. It is sadly ironic that the research indicated that the very institutions--coeducational schools--established to promote female equality are the ones reinforcing traditional sex roles to the detriment of female students.

It might be reasonable to suppose that sex-segregation upholds traditional sex-role expectations and that coeducational schools, by presenting girls with a broader range of non-traditional course offerings and with more relaxed interactions with the opposite sex, would overcome these prejudices. Yet the data indicated otherwise. With alarming consistency, girls in coeducational schools learned that their role required them to give over to boys the study of certain subjects such as math and the sciences (Ormerod 258). Girls learned it was unwise in the social structure of the coeducational school to succeed in areas where boys dominated. Interaction with males increased stereotyping (Vockell and Lobonc 217). Coeducational environments were proven to reinforce orthodox sex roles as the presence of the opposite sex caused students to identify themselves in terms of gender and to avoid courses deemed more appropriate to the opposite sex (Jones, Shallcross and Dennis 340, Trickett et al. 380). In addition the emphasis already established on academic learning in a single-sex school is not likely to convey to girls the impression that

it is unimportant whether girls do well at school or not, "a message which may well already be conveyed to girls by their socialization and culture and not always contradicted in the coeducational school" where the constant pressure to maintain boundaries, distinctiveness and identity drove students to make even more sex-stereotyped subject choices (Deem 75). A Department of Education and Science survey reported by Deem showed that girls were more likely to choose science courses in single-sex schools than they were in coeducational schools, even though a higher percentage of girls may be offered these subjects in coeducational schools (74).

Society's traditional sex roles suggest that some values are more appropriate to females, and others are more appropriate to males. In this area, research indicated that coeducational schools were at a distinct disadvantage because they encouraged females to abandon certain important attitudes toward learning--questioning, challenging and risk-taking (Powell 55). Dederick's study uncovered remarkable differences between the values of gifted single-sex school girls and coeducated girls. Single-sex students valued non-traditional qualities such as leadership and independence while coeducated girls placed greater importance on traditional feminine values of conformity and benevolence (8). Due to the nature of the study, there was no way to know if the differences were due to the gender-composition variable or to the intellectual differences of the gifted versus heterogeneous populations. Nevertheless the tentative conclusions indicated a need for continued investigation. Lockheed's work with female leadership behavior was far more conclusive. She proved that there were no differences in male and female leadership activity in single-sex

groups. Yet in mixed-sex groups whose members were unfamiliar with a task, females were less active and less influential than males (4). The presence of males restricted female leadership.

Lastly in the area of sex-stereotyping, the proper education of women deals not only with subject preference and equal access to opportunity. It also must encourage the development of sexual identity by preserving womanly qualities. In this regard, the role of the teacher can be critical. Schneider and Coutts (1979) found that coeducational school teachers, both males and females, preferred teaching boys. In fact, the only group of faculty members who preferred teaching female students were women at all-girls schools (105). In addition, the presence of women faculty in mathematics and science was less likely to lead girls to think of these subjects as "masculine." It was also more likely that successful role models in math and science would encourage girls toward non-typical subject choice (Harvey and Stables 164). Therefore what American culture regards as "unnatural" may, in fact be the most natural way for girls to overcome unfair traditional sex-stereotyping. "Normal social adjustment" given to students in mixed-schools has encompassed the worst aspects of sex-stereotyping (Deem 76). Coeducation in this regard has done some girls a great disservice. It has failed to guarantee equity for all girls.

Gender composition clearly had an effect not only on the attitudes and values of female students, but also on their actual academic performance. Hamilton's rank-order comparison of coed and single-sex school boys and girls placed single-sex school girls first and coeducated girls last in their academic achievement. The

differences for boys, though they did favor single-sex schooling, were not as great (545). While students from coeducational schools performed worse than their single-sex counterparts, the positive effects of single-sex schooling were more apparent for girls.

Harvey and Stables's first study (1985) of science in single-sex and mixed teaching groups did not support this contention. They found that girls in mixed schools did better in science than girls in all-girls schools. They also found no advantage in teaching children in single-sex science groups in mixed schools (182). However, in their later research (1986), they admitted the limitations of a one-year study where girls and boys were separated for only one subject (164). In this later work, Harvey and Stables made a case for single-sex teaching of some subjects particularly physical sciences. They found it beneficial for girls to be taught separately and found no difference for boys (169).

Finn's cross-national study showed girls in the United States, Sweden and England were outperformed by boys particularly in science. This difference was more pronounced in English coeducational secondary schools where girls performance declined while girls in English one-sex schools exceeded their male counterparts in science and reading (9). He found that some of the greatest differences between male and female performance occurring in coeducational schools were notably smaller in sex-segregated schools (22). Finn attributed these discrepancies to the role of successful female peers and teachers in single-sex schools and to the absence of social pressure from boys. These findings were confirmed by Carpenter and Hayden in Australia in 1987 where sex-composition of the school was also found to predict a

girl's exposure to curriculum choices and social influences that would mediate the effects of social structure. They also recommended at least single-sex teaching groups for some students in order to assure girls access to a broadly based education (165). Winchel, Fenner and Shaver approached the question of the coeducational school as a detriment to female academic performance from another angle. They found the cross-sex competition present in coeducational schools increased fear of success in girls (729). Thus while girls are expected to benefit from coeducation (Sutherland 168), the culture of the coeducational high schools proved to hamper the intellectual life of female students. While single-sex schooling may offer little potential for changing the teachers, the curriculum, or the boys (Willis and Kenway 132), these persuasive arguments clearly indicated that coeducational schools were not ideal settings for girls' learning.

In the four areas examined in the present study of coeducational versus single-sex secondary schools: school environment, overall academic achievement, sex-stereotyping and female academic achievement, researchers have arrived at conclusions that justified single-sex education. Only in the area of environment where method analysis proved that results were questionable, did coeducation appear to have a positive effect. In all considerations, single-sex schools were undeniably superior. They were successful at reducing the influence of the youth subculture. They encouraged intellectual development of students and they worked in opposition to traditional sex-stereotypes and thus permitted female students to achieve greater levels of academic competence. In the light of this evidence, the

somewhat unquestioning acceptance in modern education of coeducational secondary schools for all students is distressing.

Recommendations

Given the growing dissatisfaction with education in the United States and the growing demand for more educational choices, the trend toward coeducation may not be irreversible. Concerned educators, legislators and parents should give serious consideration to the results of these studies and should initiate change in public policy and practice. While it would be neither desirous or advantageous to have only single-sex secondary schools in the United States, experimenting with these options would provide more possibilities for achieving a good match between student and school. Meanwhile the evidence offered by this research suggests feasible changes which could be implemented to improve high school education in every existing setting.

First, every secondary school administration and faculty should renew its commitment to the purposes of education. It is certainly true that the life of the mind does not exist in isolation from other essential dimensions of human experience. Therefore, while the school should encourage students to participate in the many and varied experiences which enrich human life, make it interesting, enjoyable and humane, it should also recognize the limitations of its own ability to fulfill all of these social educational functions. By attempting to provide all experiences themselves, schools have become educational "shopping malls"--multipurpose gathering places for teenage socializing (Powell 56). The expanded functions of the school which have come to encompass the total social life of the students have changed the schools into very different institutions which are

placed at cross-purposes with their educational mission. This has been to the detriment of learning. Schools should also make a clearer commitment to core curriculum. By offering fewer elective choices to students and by requiring every student to take more science, more math, and more language, the options are taken out of the hands of the adolescents who tend to select courses along traditional sex-stereotyped lines.

Secondly, schools should work at creating within themselves environments for learning. If improving student satisfaction with the school environment has been accompanied by a decline in academic behavior and performance, the negative consequences of these "improvements" have outweighed any gain. Steps should be taken to resist the youth sucbculture that has exerted such a harmful influence on high school students. Opportunities for socializing at school should be reduced. The pressure on students to conform to adolescent standards of dress and appearance could be eliminated if schools required students to wear school uniforms and enforced codes for appropriate hairstyle (see Coleman, 1961b 234). Another means of creating an environment for learning would be to separate boys and girls for some courses, providing male teachers for boys and female teachers for girls. Not only would this make available same-sex role models, it would permit far less infiltration of social relations into the classroom and would afford students the benefit of developing true sexual identity and appropriate character traits. Keeping boys and girls instructionally separate even for a few subjects would give them the opportunity to experience and express themselves freely in a society of same-sex peers. Even if one believes in and supports

coeducational schools for social reasons, it is at least possible to argue a case for single-sex classes in certain subjects (Harvey and Stables, 1986 164).

A final recommendation would be for states to encourage and to support private single-sex schools within their school districts and to experiment with the development of "magnet" single-sex public schools. If the existing single-sex secondary schools close, opportunities to continue the study of this alternative school type would be lost. At the very least, the question of coeducational versus single-sex secondary schools should remain part of the national discussion about the types of school environments that should be made available to students and their parents.

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